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with a barrier set before it, just as there can be no hope of ever knowing more than a small part of the manifestations of the universe. Here, as always, pluralism is found to be in accordance with the results of history and science.

That which, in the reviewer's opinion, constitutes the weak point of what is otherwise an excellent book, is a certain superficiality with respect to metaphysical questions, and an exaggerated tendency to identify the particular with the real. Much of philosophical speculation does end in verbal distinctions, it must be confessed, and these cannot be criticized too severely; but there is also a mode of criticism which tends to give a verbal interpretation to something much more ultimate, and which fails to realize the significance of the theories condemned. Philosophy has doubtless much to learn from history and from science; and perhaps the impatience with mere speculation fostered by them both has much justification; but if men had been contented with the particular and the concrete, there would never have been any pluralistic philosophy.

G. N. DOLSON.

SMITH COLLEGE.

Nouvelles études sur l'histoire de la pensée scientifique. Par G. MILHAUD. Paris, F. Alcan, 1911.—pp. 235.

The eight studies of which this volume is composed are reprinted from various scientific and philosophic reviews appearing between 1900 and 1910. They are, however, happily brought together in a single volume, for with the possible exception of the first, an appreciative miscellany of impressions and memories of Paul Tannery, all feed a single interest, that of the logician.

The history of science is too much neglected by logicians nowadays, but perhaps that is not wholly their fault; technical histories, for example M. Cantor's masterful history of mathematics, demand a too special knowledge for those who must always remain comparative amateurs in science. Yet the problem of logic is always pushing them toward such histories, for if logic is to be a science of method, of formal proof, and perhaps even of discovery, where can its material be more fruitfully observed than in the processes through which scientists have actually made discoveries and raised hypotheses to the rank of established truths in the past? And where are significant fallacies to be found if not in the errors into which great minds have strayed? If we are ever to get beyond the barren formulæ of our logic texts which, almost daily, are multiplying a dull formalistic discipline on our hands, it will be through the work of some great intellect that shall have a grasp on the evolution of science by which it can squeeze out the significant attributes of the operations of intelligence, forgetting Holy Barbara, and creating a doctrine that exhibits what is vital in thought and not thought's mummies. In other words such an intelligence will recreate the logic of Aristotle instead of carrying on or amending scholastic attenuations of it.

Profoundest gratitude is then due to those who prepare the way for such a master work, and among the foremost of them is Paul Tannery, who has done so much to bring the science of Greece into intelligible relations with its philosophy—a most important task, for there is always a peculiar value in beginnings, in as much as great processes then appear in their simpler forms; the confusing detail of facts is lost and meanings stand in relief. It is therfore fitting that Tannery's name should stand at the head of this volume of M. Milhaud's. And M. Milhaud has ably carried on and extended the work Tannery began.

Mathematics is chiefly here in question, for mathematics has a peculiar power of kindling human imagination. "These are the two contradictory characteristics that constitute the apparent miracle of mathematical thought; spontaneity of the flight of intelligence which, heedless of every practical application, soars ever higher in its dream of abstractions—and unceasing progress of knowledge of the physical world through the possible utilization, sooner or later, of the symbols so created" (pp. 29–30).

Genuine mathematics, as a science, appeared first in Greece about the 7th century A. D., and the longest, if not the most important, chapter of this volume (pp. 41–133) is devoted to an analysis of such contributions of the Orient and Egypt to Greece as made the development of this, and the other sciences, possible. The reputed scientific knowledge of Egypt, Chaldea, India and China fades in the light of the investigation, and all that we find remaining from these civilizations is a mass of empirical rules mingled with crude superstitions and incoherent theologies. These, however, are not unimportant, and are the materials out of which science has been constituted. Logical method is the contribution of Greece, and through it comes order and that pure speculative interest that is the true mark of science.

The chapter entitled "Archimedes' Treatise on Method" is an account of a newly (1907) discovered and published manuscript. Its peculiar interest lies in the fact that in it—mathematical methods only are under consideration—Archimedes draws a sharp distinction between the method of discovery and the method of proof, including mechanics in the former because of its greater admixture of not wholly intelligible notions, such as motion; a subtlety which M. Milhaud attributes to Greek purism.

Two chapters are devoted to Descartes. The first examines the claim that Fermat was in possession of the method of analytic geometry before Descartes published his results, and considers the right of each to the honor of priority. The conclusion is reached that undoubtedly Fermat was equally in possession of the method of analytic geometry, but the seventeenth century did not feel it was a discovery on the part of either man, for the method is only an application of a procedure prevalent even in Greek mathematics. The author thinks the seventeenth century was right and that analytic geometry is only a continuation of the methods in use by Archimedes and Apollonius.

The second chapter on Descartes concerns the famous law of sines. Is Descartes's use of it (1637) a plagiarism from Snellius, who died in 1626, as Vassias says in 1662? Probably not, for considering the current status of the problem at that time we ought to be more surprised that Keppler did not also discover it than that Snellius and Descartes discovered it independently at about the same time. There is therefore no need to appeal to plagiarism to explain the coincidence.

Of the two remaining chapters, the "Laws of Movement and the Philosophy of Leibniz" is a valuable synthesizing of the scientific and the metaphysical side of this author for it traces his turnings in trying to avoid the mechanical difficulties of the Cartesian dualism between mind and body, and studies the peculiar concept of force at which he arrived through this effort.

The last chapter, on Descartes and Newton, examines the propriety of ascribing to either exclusively the title of 'Father of Modern Science.' Newton seems to be the more modern, for he is not mechanistic in the sense that Descartes is, and, for him, science has already ceased to be a system of explanation, to become merely representation, while Descartes seeks explanations by the help of definitions which he seeks to impose on facts, and does not always separate metaphysics from mechanics. The question is insoluble, however, for Descartes and Newton represent two different aspects of the scientific mind. While the latter aims at observation of experience, the former intends primarily anticipation; so they complete each other. Neither of them understood the movement of which he was a part.

HAROLD CHAPMAN BROWN.

COLUMBIA UNIVERSITY.

Manual of Mental and Physical Tests. By GUY MONTROSE WHIPPLE. Baltimore, Warwick & York, 1910.—pp. xix, 534.

The author's purpose is to bring together tests that have been actually used in physical and mental measurements, to make them available for other workers and to compare and sift out those that are most promising for future work. In furtherance of this ideal he has presented what is perhaps the most comprehensive discussion of tests in English or for that matter in any language. Fifty-four tests are described under thirteen different chapter titles. Aside from the more usual mental tests there is a preliminary chapter on the treatment of measures which gives not only an outline of the theory of probabilities as applied to measurements, but a treatment of the various measures of correlation on the basis of the work of Pearson, Spearman, Thorndike and the author. The next chapters are devoted to anthropometric measurements and physical tests. The following chapter on Sensory Capacity includes tests of muscular defects of the eye as well as the more usual tests of sensory acuity. In these earlier chapters much material is presented that is useful to the teacher. For the psychologist, there is much material that is not within his immediate province, and should prove sufficient to guide him when his problems lead, as so often they do, into the realm of physiology. In the later chapters full description is given of the methods of report or *Aussage*, and of the graded tests of de Sanctis and of Binet and Simon. No important field of investigation is omitted.

Each test is accompanied by a full bibliography and the results of the more